that of the naked eye. The photocell was completely shaded from direct sunlight by a small clock-driven disk. The recording device consisted of a galvanometer that registered every two minutes. Comparisons of galvanometer records and photometer readings permitted the former to be reduced to light units.

Continuous records were obtained during most of the period June 23–29. At noon the solar altitude was about 46°, and at midnight about 40′, neglecting atmospheric refraction.

The following are some of the results obtained:

Noon illumination intensity with clear sky, 22,000 lux=2,044 ft. c.

Noon illumination intensity with cloudy sky, 26,000 lux=2,415 ft. c.

Midnight illumination intensity with some high clouds, 1,200 ux=111 ft. c.

The duration of totality of the eclipse was 40 seconds. During this time, with 8 A. Cu. clouds present, photometric measurements gave for the horizontal illumination intensity 6.8 lux=0.6 ft. candles.

These are somewhat higher values than were obtained by me at Washington,[3] namely, with the sun 46° above the horizon and a clear sky, 1,450 ft. c. and with the sun at the same altitude but with a cloudy sky, 1,600 ft. c. In a private letter, recently received, Kalitin attributes his high values to low atmospheric transmissibility for solar radiation (0.793 on June 24, 0.742 on June 28, and 0.716 on June 29, the day of the eclipse). Generally, low transmissibility is due principally to increased atmospheric scattering of the solar rays, which gives increased intensity to diffuse skylight.—*H. H. K.*

[3] Kimball, Herbert H. and Hand, Irving F. Daylight Illumination on Horizontal, Vertical, and Sloping Surfaces. Mo. Wea. Rev., 50 : 618, 1922.

BIBLIOGRAPHY

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NOTE.—This section will be resumed in the next issue (May).—ED.

551.590.2

SOLAR OBSERVATIONS

SOLAR RADIATION MEASUREMENTS MADE DURING APRIL, 1929

By HERBERT H. KIMBALL

For reference to descriptions of instruments and exposures, and an account of the method of obtaining and reducing the measurements, the reader is referred to the January, 1929, REVIEW, page 26.

Table 1 shows that solar radiation intensities averaged close to normal values for April at Washington and below normal values at Madison and Lincoln.

Table 2 shows an excess in the total radiation received on a horizontal surface at Chicago, and a deficiency at Washington, Madison, Lincoln, and New York.

Skylight polarization measurements obtained on four days at Washington give a mean of 58 per cent with a maximum of 62 per cent on the 2d. These are close to the corresponding averages for April at Washington. At Madison measurements obtained on five days give a mean of 63 per cent, with a maximum of 67 per cent on the 13th. These are close to the corresponding averages for April at Madison.

TABLE 1.—*Solar radiation intensities during April, 1929*

[Gram-calories per minute per square centimeter of normal surface]

Washington, D. C.

Date	Sun's zenith distance: 8 a.m.	78.7°	75.7°	70.7°	60.0°	0.0°	60.0°	70.7°	75.7°	78.7°	Noon
	75th mer. time	Air mass: A. M.					P. M.				Local mean solar time
	e.	5.0	4.0	3.0	2.0	[1] 1.0	2.0	3.0	4.0	5.0	e.
	mm.	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*mm.*
Apr. 2	4.57	0.71	0.84	0.93	1.26	1.34	1.11	0.89			2.74
Apr. 3	6.76		0.66	0.78	0.98	1.22					4.75
Apr. 12	6.50					1.38					6.76
Apr. 13	7.57					1.24					7.87
Apr. 19	3.45		0.74	0.99	1.12	1.44					3.45
Apr. 20	5.36			0.77	1.03	1.27					6.27
Apr. 23	4.17		0.83	1.02	1.17	1.41					3.15
Apr. 24	6.02				0.95						7.04
Apr. 27	7.29				0.99						6.27
Apr. 29	4.57				1.30	1.43	1.21	1.02			3.99
Means		(0.71)	0.77	0.90	1.10	1.34	(1.16)	(0.96)			
Departures		±0.00	+0.01	±0.00	+0.02	−0.02	+0.06	+0.05			

[1] Extrapolated.

TABLE 1.—*Solar radiation intensities during April, 1929*—Contd.

[Gram-calories per minute per square centimeter of normal surface]

Madison, Wis.

Date	Sun's zenith distance: 8 a.m.	78.7°	75.7°	70.7°	60.0°	0.0°	60.0°	70.7°	75.7°	78.7°	Noon
	75th mer. time	Air mass: A. M.					P. M.				Local mean solar time
	e.	5.0	4.0	3.0	2.0	1.0	2.0	3.0	4.0	5.0	e.
	mm.	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*mm.*
Apr. 2	4.57				1.25		1.19				3.45
Apr. 13	4.17			1.08	1.27	1.48					3.63
Apr. 15	4.17			1.07	1.23	1.47					4.17
Apr. 18	3.00				1.25	1.55					3.15
Apr. 22	4.75		0.89	1.01	1.13	1.39					3.81
Apr. 26	4.95		0.67	0.81	1.04	1.30					5.56
Apr. 29	3.63				1.17						3.63
Means			0.78	0.99	1.19	1.44	(1.19)				
Departures			−0.21	−0.09	−0.03	+0.02	−0.03				

Lincoln, Nebr.

Apr. 2	3.81	0.60			1.16	1.47	1.14				4.75
Apr. 8	4.57						1.17	1.06	0.98	0.69	2.87
Apr. 12	3.81			0.92	1.15		1.13				5.59
Apr. 16	6.50				1.21						3.81
Apr. 17	3.43	0.70	0.88	1.01							6.02
Apr. 26	3.43	0.59	0.79								3.43
Apr. 28	6.27						1.08	1.00	0.84	0.69	4.95
Apr. 29	6.27			0.92	1.14	1.39					6.50
Apr. 30	3.81			0.80							5.59
Means		0.63	(0.84)	0.91	1.16	(1.43)	1.13	(1.03)	(0.91)	(0.69)	
Departures		−0.10	±0.00	−0.07	−0.05	−0.02	−0.05	+0.04	+0.05	−0.03	

TABLE 2.—*Solar and sky radiation received on a horizontal surface*

[Gram-calories per square centimeter of horizontal surface]

Week beginning—	Average daily radiation: Washington	Madison	Lincoln	Chicago	New York	Twin Falls	Fresno	Average daily departure from normal: Washington	Madison	Lincoln	Chicago	New York
	cal.	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*
Apr. 2	456	423	456	330	270	280	434	+66	+46	+39	+41	−59
Apr. 9	247	384	306	309	152	(1)	606	−149	−20	−109	±0	−185
Apr. 16	317	372	350	353	160	466	571	−102	−32	−88	+45	−164
Apr. 23	419	316	421	292	341	553	631	+1	−112	−55	−8	+12
Excess or deficiency since first of year on Apr. 29, 1929								−1,197	−1,841	−4,319	+1,519	−2,737

[1] Incomplete record.